

Climate Change: From Climate to Economics: Anticipating Impacts of Climate Change in California

Speakers and Session Chairs Biographies

Arthur H. Rosenfeld, Ph.D.

Commissioner, California Energy Commission

Commissioner Arthur H. Rosenfeld, PhD, is presiding member of the Research, Development and Demonstration Committee and the Dynamic Pricing Committee (Ad Hoc Committee); and the second member of the Energy Efficiency Committee.

Dr. Rosenfeld received his PhD in Physics in 1954 under Nobel laureate Enrico Fermi, then joined the Department of Physics at the University of California at Berkeley. There he joined, and eventually led, the Nobel prize-winning particle physics group of Luis Alvarez at Lawrence Berkeley National Laboratory until 1974. At that time, he changed to the new field of efficient use of energy, formed the Center for Building Science at Lawrence Berkeley National Laboratory (LBNL) and led it until 1994. The Center developed electronic ballasts for fluorescent lamps (which led to compact fluorescent lamps), low-emissivity windows, and the DOE-2 computer program for the energy analysis and design of buildings, for which Dr. Rosenfeld was personally responsible.

Dr. Rosenfeld received the Szilard Award for Physics in the Public Interest in 1986, and the Carnot Award for Energy Efficiency from the U.S. Department of Energy in 1993. He is the co-founder of the American Council for an Energy Efficiency Economy (ACEEE), the University of California's Institute for Energy Efficiency (CIEE), and the Washington-based Center for Energy and Climate Solutions (CECS).

From 1994-1999 Dr. Rosenfeld served as Senior Adviser for the U. S. Department of Energy's Assistant Secretary for Energy Efficiency and Renewable Energy.

Alan C. Lloyd, Ph.D.

Chairman, California Air Resources Board

Dr. Alan C. Lloyd is Chairman of the Air Resources Board, a branch of the California Environmental Protection Agency. He oversees a \$150 million budget and a staff of nearly 1,000 employees. The 11-member Board's mission is to promote and protect public health, welfare, and ecological resources through effective reduction of air pollutants while recognizing and considering effects on the economy.

As Chairman, Dr. Lloyd is committed to cultivate a mindset and an attitude throughout government, industry, and society that zero- and near-zero emission technologies can be put to use now or in the immediate future to help the state meet its air quality goals. He initiated the environmental justice focus within the agency and led the efforts resulting in the adoption of the Environmental Justice Policy and actions to be followed up by the Board.

Dr. Lloyd has given many presentations to national and international audiences, focusing on the viable future of advanced technology and renewable fuels, with attention to the urban air quality challenges faced by California and to the impact on global climate change. He is a major proponent of alternate fuels, electric drive and fuel cell vehicles eventually leading to a hydrogen economy. Dr. Lloyd was the 2003 Chairman of the California Fuel Cell Partnership and is a co-founder of the California Stationary Fuel Cell Collaborative.

He earned both his Bachelor of Science in Chemistry and PhD in Gas Kinetics at the University College of Wales, Aberystwyth, U.K

Steve Shaffer

California Department of Food and Agriculture

Steve Shaffer is Director of the Office of Agriculture and Environmental Stewardship for CDFA, the position he has held since November 2000. The office is comprised of an outstanding group of scientists who address environmental issues related to agriculture using a multidisciplinary approach. In this capacity, Steve represents CDFA on a number of environmental and natural resource management planning, implementation, and monitoring activities as they relate to agriculture.

Steve Shaffer joined the CDFA Plant Pathology Diagnostics Laboratory in 1975 after graduating UC Santa Barbara with a degree in Biochemistry/Molecular Biology. Steve moved to the Agricultural Resources Branch in 1981 where he managed several technical and financial assistance programs supporting agriculture-based energy systems and new uses of agricultural materials. Steve later assumed responsibilities for land use, and water supply issues, including California Environmental Quality Act (CEQA) review.

In 1992 Steve joined the newly created Office of Pesticide Consultation and Analysis, where he worked on a variety of pest management, water quality, and air quality issues. He was also charged with leading CDFA activities required under the rice straw burning phasedown mandate.

Steve assumed lead responsibility for CDFA on the CALFED Bay-Delta Program in 1995. Steve continues to represent CDFA on the California Bay-Delta Authority and on a number of other water supply and water quality activities including the State Non-Point Source Pollution Control Program, the State Water Plan (Bulletin 160), and the San Joaquin Valley Drainage Program. Steve is also a member of the Delta Protection Commission.

Most recently, Steve is serving on the Governor's California Performance Review, a comprehensive review of State government "to make it work better and cost less."

V. (Ram) Ramanathan, Ph.D. *Keynote Speaker*

Scripps Institution of Oceanography

V. (Ram) Ramanathan is an atmospheric scientist whose research focuses on global climate dynamics, the greenhouse effect, aerosols, clouds, and the Earth radiation budget. He has published over 150 papers in journals and books. At Scripps Institution of Oceanography (part of the University of California, San Diego) he is the Victor C. Alderson Professor of Applied Ocean Sciences, and the Director of the Center for Atmospheric Sciences. He is also the co-chief scientist of the Atmospheric Brown Cloud Project and the Indian Ocean Experiment, which led to the discovery of the South Asian brown haze and its radiative forcing. He has served on numerous national and international committees and has given expert testimony before the U.S. Congress.

Ramanathan is widely recognized for his work in understanding the effects of trace gases, clouds, and aerosols in the atmosphere. He was the first to demonstrate, in 1975, that chlorofluorocarbons are important greenhouse gases. In the early 1980s, he led a World Meteorological Organization study which concluded that numerous trace gases are significant contributors to global warming. In the late 1980s, he headed a NASA study that demonstrated that clouds have a net global cooling effect on the planet. Since then he has conducted two international field experiments: the Central Equatorial Pacific Experiment (1993) and the Indian Ocean Experiment with P. J. Crutzen (1995–1999). He showed that black carbon and other aerosols in the South Asian haze lead to a large reduction in solar radiation reaching the Earth's surface. Now he is

studying the effects of Atmospheric Brown Clouds over the Pacific Ocean and western North America, including their role in surface dimming and their interactions with the climatic effects of greenhouse gases.

Dr. Ramanathan's numerous national and international honors include membership in the National Academy of Sciences, the Buys Ballot Medal from the Royal Netherlands Academy of Sciences which is presented every ten years (most prestigious award in earth sciences given by that academy), the VOLVO environmental prize for trail-blazing research relating to the greenhouse effect, the Rossby Medal (highest award given by the American Meteorological Society), and the Pioneer Award presented by the National Science Foundation for groundbreaking work with the Science and Technology Center Concept. For more information, please visit <http://www-ramanathan.ucsd.edu>.

Peter Berck, Ph.D.

University of California, Berkeley

Peter Berck is a professor in the Department of Agricultural and Resource Economics and Policy at the University of California at Berkeley. His current work is on the local economic effects of environmental (including water) regulation. He is the author of the Dynamic Revenue Analysis Model (DRAM), which is used to predict the economic impact of regulations and fiscal policy in California. He has also written about the economics of extinction, forestry, marketing, agricultural production, and environmental policy. Peter Berck has been Editor of the *American Journal of Agricultural Economics* for the last five years. He received his BA in Mathematics from the University of California Berkeley, his PhD in Economics from M.I.T., and a PhD Honorable Causis from Umea Universitet (Sweden).

Kelly Birkinshaw, M.S.

California Energy Commission

Mr. Birkinshaw is the environmental program manager for the Public Interest Energy Research Program of the California Energy Commission. In this capacity, he is responsible for a \$50 million research project portfolio addressing energy and the environment in the areas of air quality, water resources, land use/habitat, and climate change. As part of an integrated approach to climate change research, Mr. Birkinshaw established a virtual research center for regional-specific studies. This center, known as the California Climate Change Center, has core research activities at the Scripps Institution and University of California (UC), Berkeley. He is deputy director of the West Coast Carbon Sequestration Partnership and is currently creating an air quality research program at the Center for Sustainable Urban Development at UC Riverside. He received a BS and MS in chemical engineering from UC Davis.

Peter D. Bromirski, Ph.D.

Scripps Institution of Oceanography

Peter Bromirski is an Assistant Project Scientist at Scripps Institution of Oceanography. Previously, he has been a researcher at NOAA/SWFSC and at the University of Hawaii, Manoa. Dr. Bromirski's interests are wave climate variability in the northeast Pacific, microseismic source areas and distribution in relation to wave climate, tide gauge data studies, and shear waves in marine sediments. He holds an MS in Natural Resources from Humboldt State University and a PhD in Geology and Geophysics from the University of Hawaii.

Sandra Brown, Ph.D.

Winrock International

Sandra Brown is a senior scientist in the Ecosystems Services Unit of Winrock International. Prior to joining Winrock, she was a Professor in the forestry department at the University of Illinois in Champaign-Urbana. Dr. Brown is a specialist on understanding the role of forests in the global carbon cycle and their present and

potential future role in climate change and mitigation. She has a national and international reputation as a leader in the field of forests and their relation to climate change and mitigation, and provides scientific leadership and expertise to many national and international organizations. Dr. Brown has 20 years of experience in planning, developing, implementing, and managing research projects focusing on estimating and modeling the stocks and flows of carbon in forests and the environmental and human factors that influence them, which has resulted in more than 160 publications. She has demonstrated expertise in synthesizing and reviewing the state of scientific knowledge on land-use change, forestry, and mitigation for the Intergovernmental Panel on Climate Change. She has a PhD in systems ecology from the Department of Environmental Engineering Sciences, University of Florida, Gainesville; an MS in engineering science from the University of South Florida, Tampa; and a BSc in chemistry from the University of Nottingham, England.

Daniel R. Cayan, Ph.D.

Scripps Institution of Oceanography/U.S. Geological Survey

Daniel R. Cayan is a Researcher in the Climate Research Division of the Scripps Institution of Oceanography (SIO) at the University of California, San Diego, and in the Water Resources Division of the U.S. Geological Survey. He is currently directing the California Applications Program (CAP) at the NOAA Office of Global Programs—a collective of university, federal, and private agency scientists studying the impacts of climate variability and attempting to improve climate and extended weather forecasts in the California region. He is also continuing studies of California boating and coastal weather for the Department of Boating and Waterways, to describe and understand the atmospheric systems that generate high waves, determine which climate regimes (El Niño, La Niña, neutral years) favor the generation of each of these waves, and provide better predictions of high wave incidence along the California coast. Other research areas include: warm seasonal hydroclimatic variability in Western North America; the use of climate models to forecast mosquito abundance and encephalitis virus risk in California; and modeling, predictability, and prediction of North American hydrologic extremes. [Dr. Cayan is the Director of the California Climate Change Center at Scripps.](#) Dr. Cayan holds a PhD in Oceanography from the University of California at San Diego, an MS in Meteorology from the University of California at Davis, an MS in Oceanography from the University of Michigan, and a BS in Meteorology and Oceanography from the University of Michigan.

Francis Ilwhan Chung, Ph.D.

California Department of Water Resources

Francis Chung is currently Principal Engineer, Water Resources, and Chief of Modeling Support Branch at the California Department of Water Resources. He has over 25 years of experience in surface and subsurface hydrology, open channel hydrodynamics, water quality, and water resources systems engineering. He earned his BS in Civil Engineering from Seoul National University, and his MS and PhD in Civil Engineering at the University of California, Davis, with an emphasis on Water Resources Planning and Management.

Michael Dettinger, Ph.D.

U.S. Geological Survey/Scripps Institution of Oceanography

Dr. Michael Dettinger is a research hydrologist for the U.S. Geological Survey, Branch of Western Regional Research, and a research associate of the Climate Research Division at Scripps Institution of Oceanography. Dr. Dettinger has monitored, evaluated, and researched water resources of the West for over 20 years, with emphases in the areas of regional surface water and groundwater systems, water availability, watershed modeling, and climatic influences on water resources. Among other activities, he received a Vice President's National Performance Review Award for physical-sciences leadership in Mojave Desert Ecosystems science and data management planning efforts in 1996, was an Associate Editor of the journal *Water Resources Research* from 1998–2000, has been the program chair and fundraiser for the annual Pacific Climate (PACCLIM) Workshops from 1998 to the present, and is team leader for the CALFED Bay-Delta Restoration Program's

white paper on CALFED's climate-science needs. He has degrees from the University of California, San Diego (Physics), Massachusetts Institute of Technology (Civil Engineering), and a PhD from the University of California, Los Angeles (Atmospheric Sciences).

Alexander E. Farrell, Ph.D.

University of California, Berkeley

Alexander E. Farrell is an Assistant Professor in the Energy and Resources Group at the University of California, Berkeley. He has a BS in Systems Engineering from the U.S. Naval Academy and a PhD in Energy Management and Policy from the University of Pennsylvania. Prior to this, he was at Carnegie Mellon University, where he was a Research Engineer and Executive Director of the Carnegie Mellon Electricity Industry Center. Prior to that, he had positions with Harvard University; the American Association for the Advancement of Science; Air Products and Chemicals, Inc.; and the U.S. Navy. Alex's research focuses on the technologies, economics, and politics of energy and the environment. He has worked extensively on emission trading.

Guido Franco, M.S.

California Energy Commission

Guido Franco is Senior Engineer in Climate Change Research at the Public Interest Energy Research (PIER) Program of the California Energy Commission. Mr. Franco's area of work has focused on air quality and climate change. He has conceived and brought to fruition several air quality research projects. For the last five years, he has been focusing on climate change issues. He was the technical manager and main author of the statewide inventory of greenhouse gas emissions released by the California Energy Commission (Commission) in 1997. This inventory was very well received and prompted the Legislature to pass a law requiring the Commission to periodically update the 1997 inventory. Again under Mr. Franco's lead, the Commission updated this inventory in 2002. Mr. Franco is now the technical research manager for projects on climate change for the Public Interest Energy Research (PIER) Program, which is managed by the Commission. He led the development of a long-term research plan on climate change and was one of the main authors of this plan. PIER is implementing this plan through the creation of the California Climate Change Center that is a joint research effort between the PIER program and the University of California. He provides technical leadership for this Center for the PIER program. Mr. Franco is a certified engineer in California and obtained a master's degree at the University of California at Berkeley, specializing in thermal sciences and fluid mechanics.

Peter C. Frumhoff, Ph.D.

Union of Concerned Scientists

Peter C. Frumhoff is Senior Scientist and Director of the Global Environment Program at the Union of Concerned Scientists (UCS). A global change ecologist, Dr. Frumhoff leads UCS's work to bring scientific expertise to bear on strengthening U.S. and international policies affecting climate change, deforestation and land-use change, and the spread of invasive species. He is also Adjunct Professor of International Politics at the Fletcher School of Law and Diplomacy at Tufts University. Dr. Frumhoff is currently serving as a lead author of the Fourth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC) and was previously a lead author of the IPCC Special Report on Land-Use, Land-Use Change and Forestry. Prior to joining UCS, Dr. Frumhoff taught at Harvard University and the University of Maryland, and served as AAAS Science and Diplomacy Fellow at the U.S. Agency for International Development. He received a PhD in ecology from the University of California at Davis.

Konstantine P. Georgakakos, Sc.D.

Hydrologic Research Center/ Scripps Institution of Oceanography/University of Iowa

Dr. Georgakakos is a Founding Director and Senior Research Scientist of the Hydrologic Research Center at San Diego, California, a public-benefit nonprofit research, technology transfer and training corporation (www.hrc-web.org). He holds titles of Adjunct Professor at the Scripps Institution of Oceanography, University of California San Diego, and the Department of Civil and Environmental Engineering, The University of Iowa. Dr. Georgakakos has been appointed US Expert in Hydrologic Modeling to the WMO Commission for Hydrology Working Group on Applications. He has received the U.S. National Science Foundation Presidential Young Investigator Award and The University of Iowa University Faculty Scholar Award. He has served as the chair and member of the AMS Hydrology and AGU Precipitation Committees, and as Associate Editor for *Journal of Hydrology* and ASCE *Journal of Hydrologic Engineering*. He is a consultant to Food and Agriculture Organization of the United Nations, a member of the National Research Council Committee on Assessment of Water Resources Research for the Nation, and a member of the U.S. Bureau of Reclamation Research Steering Team. His research interests are surface hydrology, hydrometeorology, and hydroclimatology. Current research topics include: integrating climate and hydrologic forecasts with water resources management, distributed hydrologic modeling with remote sensing data, and orographic rainfall modeling under boundary and initial condition uncertainty. Dr. Georgakakos has authored or co-authored more than 90 refereed journal publications and 15 contributions to books. He has undertaken several technology transfer activities that led to operational systems, including an Integrated Climate-Hydrology-Decision system for Northern California water resources management (in progress). Dr. Georgakakos holds MS and ScD Degrees in Hydrology and Water Resources, Civil Engineering, from MIT.

Michael Hanemann

University of California–Berkeley

W. Michael Hanemann is a professor in the Department of Agricultural Resource Economics and Policy at the University of California, Berkeley. His research interests include: commercial energy consumption; energy consumption in agriculture; energy consumption in industry; energy demand, conservation, and investment; energy microeconomics; environmental economics and policy; renewable resources; residential energy consumption; and water resource economics. Professor Hanemann is an eminent academic, has worked on legal cases involving natural resource damage assessment, and has spoken on natural resource damage assessment at many conferences. [Prof. Hanemann is the Director of the California Climate Change Research Center at Berkeley.](#) Relevant publications include: R. T. Carson, and W. M. Hanemann, A Preliminary Economic Analysis of Recreational Fishing Losses Related to the Exxon Valdez Oil Spill (1992); T. C. Wegge et al., An Economic Assessment of Marine Recreational Fishing in Southern California (U.S. Dept. of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Southwest Region, 1986) (with W. Michael Hanemann); and H. J. Albers et al., Valuation and Management of Tropical Forests: A Theoretical and Empirical Analysis (*Environmental and Resource Economics* 8, 39–61, 1996) (with W. Michael Hanemann).

Lee Hannah, Ph.D.

Center for Applied Biodiversity Science of Conservation International

Lee Hannah is Senior Fellow in Climate Change Biology at the Center for Applied Biodiversity Science of Conservation International (CI). He heads CI's efforts to develop conservation responses to climate change and is co-leading CI's collaborative effort with the Nature Conservancy on this topic. He is co-author of "Extinction Risk from Climate Change," which attracted widespread international attention when it appeared as the cover story of the journal *Nature* this year. His research interests include the role of climate change in conservation planning and methods of corridor design. He has written on the global extent of wilderness and the role of communities in protected area management. He holds an undergraduate degree in biology from the University of California at Berkeley and a PhD in Environmental Science from UCLA.

Alex Haxeltine

Tyndall Centre for Climate Change Research

Dr. Haxeltine is the international science coordinator at the Tyndall Centre—the UK's flagship Centre for research on sustainable responses to climate change. In this role, he is currently involved in putting together a number of large European research projects on adaptation and mitigation strategies for climate change. He also works to ensure that the research carried out at the Tyndall Centre is interfaced with the national and international policy processes, and during 2003/2004 he has been on secondment to the climate change policy group in the UK Government's Department of the Environment, Food and Rural Affairs. Alex's original training was in the natural sciences and he holds a doctoral degree in Ecology. His current personal research is in integrated sustainability assessment and focused on the socio-cultural dimensions of a transition to sustainability.

Hideki Kanamaru

Scripps Institution of Oceanography

Hideki Kanamaru is a Postgraduate Researcher at Scripps Institution of Oceanography. He studied chemistry at the University of Tokyo (BSc in Chemistry, 1996) and environmental sciences at the University of East Anglia in the UK (MSc in climate change, 1998). He moved to the United States to pursue his interest in climate change issues and completed a PhD in Geography at Boston University in 2003.

Masao Kanamitsu

Scripps Institution of Oceanography

Dr. Kanamitsu is a senior researcher at the Scripps Institution of Oceanography, University of California, San Diego. His research includes climate prediction, historical analysis of atmospheric data and downscaling using numerical models and data assimilation technique. His PhD is in Meteorology at the Department of Meteorology, Florida State University. He spent several years at major international meteorological centers in Europe, USA, Japan and Australia. He was a core member of the NCEP/NCAR reanalysis project and also conducted NCEP/DOE Reanalysis-2.

Dennis P. Lettenmaier, Ph.D.

University of Washington

Dennis Lettenmaier is professor of water resource engineering and hydrology at the University of Washington, and the Director of its Surface Water Hydrology Research Group. He received his BS in Mechanical Engineering (summa cum laude) at the University of Washington in 1971; his MS in Civil, Mechanical, and Environmental Engineering at George Washington University in 1973; and his PhD at the University of Washington in 1975. He spent a year as visiting scientist at the U.S. Geological Survey in Reston, Virginia (1985–1986) and was the Program Manager of NASA's Land Surface Hydrology Program at NASA Headquarters in 1997–1998. He was a recipient of ASCE's Huber Research Prize in 1990, is a Fellow of the American Geophysical Union and American Meteorological Society, is the author of over 100 journal articles, and is Chief Editor of the American Meteorological Society's *Journal of Hydrometeorology*.

Changsheng S. Li, Ph.D.

University of New Hampshire

Dr. Changsheng S. Li is a Research Associate Professor in the Complex Systems Research Center within the Institute for the Study of Earth, Oceans, and Space, at the University of New Hampshire. Prior to that, he was Associate Professor and Deputy Director of the Research Center for Eco-Environmental Sciences, Chinese Academy of Sciences, and senior official of National Environmental Protection Agency of China. Dr. Li has developed several biogeochemical models to describe the cycling of trace or abundant chemical elements and their effects on human health, resources, or environment. Dr. Li developed the Denitrification-Decomposition (DNDC) model, which can be used to predict C and N dynamics under various climate, soil, land-use and management conditions in agricultural ecosystems. The model is currently being used for the

studies of trace gas emissions, fertilizer efficiency, crop production, and water N contamination. Changsheng Li received his bachelor's degree in Geochemistry from the University of Science and Technology of China, his master's degree in Environmental Chemistry from the Chinese Academy of Sciences, and his PhD in Biogeochemistry from the Chinese Academy of Sciences and University of Wisconsin.

Jay R. Lund

University of California, Davis

Jay Lund is a Professor of Civil and Environmental Engineering at the University of California, Davis. He specializes in the integrated management of large-scale water and environmental systems. His modeling activities have included economic-engineering optimization modeling of California's extensive inter-tied system, the Columbia River system, the Missouri River system, and other smaller systems—as well as more theoretical and methodological studies of integrated systems, including water marketing, water conservation, and reservoir system operations. For more information, see <http://cee.engr.ucdavis.edu/faculty/lund/>.

Jessica Lundquist

Scripps Institution of Oceanography

Jessica Lundquist is finishing her PhD in oceanography, with an emphasis in hydroclimatology, at Scripps Institution of Oceanography, at the University of California, San Diego, this summer. She grew up in Sacramento and spent her summers playing in the Tuolumne River in Yosemite National Park. After getting a BS in atmospheric science at the University of California, Davis, she moved to San Diego where she applied her childhood love of mountain streams to researching snowmelt and river runoff in the Sierra Nevada. [Ms. Lundquist has received numerous awards including the Peter B. Wagner Memorial Award for Women in Atmospheric Sciences and the Canon National Parks Scholarship.](#)

Norman Miller, Ph.D.

Lawrence Berkeley National Laboratory/University of Arizona

Norman Miller is a Staff Scientist, Hydrometeorologist, and Group Leader in the Atmosphere and Ocean Sciences Group, Geochemistry Department, Earth Sciences Division at the Lawrence Berkeley National Laboratory (LBNL), and an Adjunct Professor in the Hydrology and Water Resources Department at the University of Arizona, in Tucson. He is also Principal Investigator at the California Water Resources Research and Applications Center, which is one of seven NASA RESAC (Regional Earth Science Applications Centers) and is a member of the ESIP (Earth Sciences Information Partnership). In that capacity, Dr. Miller's primary focus is on hydroclimate and impacts research based on modeling and analysis of regional climate, streamflow, and water demand, water quality, and agriculture impact models. He investigates past, present, and future climate on regional and sub-regional spatial scales at various temporal resolutions. This research utilizes global climate historical analysis, short-term and seasonal forecasts, and long-term projected transient carbon dioxide scenarios as input forcing to a limited-area mesoscale atmospheric simulation model, statistical downscaling schemes, and a suite of hydrologic models and applications. Dr. Miller earned his BS in Engineering Science at the University of Maryland, College Park; and his MS and PhD in Meteorology at the University of Wisconsin, Madison.

Larry Myer, Ph.D.

University of California Office of the President/California Institute for Energy and Environment

Dr. Larry Myer is currently Technical Director for the West Coast Regional Carbon Sequestration Partnership, which is evaluating carbon dioxide capture, transport, and sequestration technologies, involving both terrestrial and geologic options, for the region comprising Arizona, California, Nevada, Oregon, Washington, and Alaska. Dr. Myer also co-directs the DOE-funded QEO-SEQ project, which is an applied

R&D effort focused on monitoring and verification, subsurface flow, and transport in geologic sequestration. His personal research interests include deformation and failure of rock, seismic wave propagation, and fluid flow in fractured, porous media. Dr. Myer has a PhD in Geological Engineering from the University of California, Berkeley, and a BSc in Engineering Mechanics from Pennsylvania State University.

Lynn Price

Lawrence Berkeley National Laboratory

Lynn Price is a Scientist and Deputy Group Leader of the International Energy Studies Group in the Energy Analysis Department, Environmental Energy Technologies Division of the Lawrence Berkeley National Laboratory. Ms. Price has been a contributing lead author and a lead author for a number of Intergovernmental Panel on Climate Change reports, including the Second Assessment Report, the report on Policies and Measures for Mitigating Climate Change, the Special Report on Emissions Scenarios, and the Third Assessment Report. She will also be a lead author for the industrial sector chapter in the IPCC's Assessment Report 4. Current research areas include mitigation of greenhouse gas emissions in the industrial sector, development of global scenarios of greenhouse gas emissions, development of multi project baselines for energy-efficiency projects, international benchmarking of energy use and greenhouse gas emissions, and effectiveness of voluntary agreements for use in China's industrial sector.

Kelly Redmond, Ph.D.

Desert Research Institute

Since 1989, Kelly T. Redmond has been the Regional Climatologist at the Western Regional Climate Center located at the Desert Research Institute in Reno, Nevada. He has been Deputy Director since 1992. His research and professional interests span every facet of climate and climate behavior, its physical causes and behavior, how climate interacts with other human and natural processes, and how such information is acquired, used, communicated, and perceived. He worked in the Atmospheric Sciences Department at Oregon State University from 1982–1989 (the last six years as State Climatologist for Oregon) and served as President of the American Association of State Climatologists in 1989–1990. He received a BS in Physics from the Massachusetts Institute of Technology in 1974, and MS (1977) and PhD (1982) degrees in Meteorology from the University of Wisconsin in Madison.

David Roland-Holst, Ph.D.

University of California, Berkeley

David Roland-Holst is the James Irvine Professor of Economics at Mills College and Director of the Rural Development Research Consortium at the University of California, Berkeley. A leading expert on policy modeling, Computable General Equilibrium (CGE) models, and social accounting matrices, he has extensive research experience on the environment, economic development, and international trade. Professor Roland-Holst has served in several academic posts in Europe and the United States. He has also worked with public institutions, including a variety of federal and state agencies, the Asian Development Bank, Inter-American Development Bank, Organization for Economic Cooperation and Development (OECD), World Bank, and the United Nations—as well as governments in Asia, Latin America, Europe, and the United States. He has undertaken applied research in over 25 countries and has authored numerous journal articles and books. Professor Roland-Holst holds a PhD from the University of California, Berkeley.

Maurice Roos

California Department of Water Resources

Currently, Mr. Roos is Chief Hydrologist (part time) with the California Department of Water Resources in Sacramento, California, in its Division of Flood Management. Mr. Roos had 43 years of experience as a water engineer with DWR when he retired from full-time service in July 2000. Prior to retirement, he oversaw work on flood forecasting, hydrology, water supply, and snowmelt forecasting, staff meteorology, and related subjects. As Chief Hydrologist, he also provided (and continues to provide) advice on these topics and on drought, floods, global warming, and weather modification, and has participated in elements of the California Water Plan update (DWR Bulletin 160). He has kept abreast of a number of CALFED Bay Delta and Central Valley Project studies, especially as these affect water supplies and agricultural water use efficiency. In 2002 he helped the California Energy Commission in an extensive study developing research suggestions on the effects of climate change on water resources. Currently he is a member of the Board of the U. S. Committee on Irrigation and Drainage and has participated in many of their recent conferences. For years he has been attempting to track climate change issues as well, especially as they relate to water supply in California. He received a BS in Civil Engineering from San Jose State University in 1957 and has since been employed by DWR.

William A. Salas, Ph.D.

Applied Geosolutions, LLC

William A. Salas is President and Manager of Applied Geosolutions, LLC, a company that provides consulting services in training and applications of geo-spatial technologies for environmental applications. Mr. Salas' expertise includes use of remote sensing and GIS tools for environmental applications; GIS and remote sensing technical support; applications of transportation, land use, urban sprawl and biogeochemical models for assessing environmental impacts of land use; and training and technology transfer in the use of geo-spatial technologies. Principals of the company have a long history of successful contracts and grants with government, academia, and private industry. Mr. Salas has a PhD and an MA in Natural Resources from the University of New Hampshire, and a BS in Mathematics from the University of Vermont.

Alan H. Sanstad, Ph.D.

Lawrence Berkeley National Laboratory

Alan H. Sanstad is a Staff Scientist at Lawrence Berkeley National Laboratory. His interests include the economic and policy analysis of energy efficiency and technological change, and the integrated assessment of global climate change. His work has appeared in journals including *Energy Economics*, *Energy Policy*, and *Contemporary Economic Policy*, as well as in various monographs, book chapters, and working papers. He holds an AB degree in applied mathematics and MS and PhD degrees in operations research from the University of California at Berkeley.

Benjamin David Santer, Ph.D.

Lawrence Livermore National Laboratory

Benjamin Santer is an atmospheric scientist at Lawrence Livermore National Laboratory (LLNL). His research focuses on such topics as climate model evaluation, the use of statistical methods in climate science, and identification of natural and anthropogenic "fingerprints" in observed climate records. Ben's early research on the climatic effects of combined changes in greenhouse gases (GHGs) and sulfate aerosols contributed to the historic "discernible human influence" conclusion of the 1995 Report by the Intergovernmental Panel on Climate Change (IPCC). His recent work indicates that observed increases in tropopause height since 1979 are largely driven by human-induced changes in well-mixed GHGs and stratospheric ozone. He is currently addressing the contentious issue of whether model-simulated changes in tropospheric temperature are in accord with satellite-based temperature measurements. Ben holds a doctorate in climatology from the University of East Anglia in England, where he studied under Dr. Tom Wigley. After completion of his PhD

in 1987, he spent five years at the Max-Planck Institute for Meteorology in Germany, where he worked with Prof. Klaus Hasselmann on the development and application of climate fingerprinting methods. In 1992, Ben joined the Program for Climate Model Diagnosis and Intercomparison at LLNL. He served as convening Lead Author of the climate-change detection and attribution chapter of the 1995 IPCC report. His awards include a MacArthur Fellowship in 1998 and the Department of Energy's E.O. Lawrence Award in 2002.

Stephen H. Schneider
Stanford University

Stephen H. Schneider of Stanford University is a professor in the Department of Biological Sciences, a Senior Fellow at the Institute for International Studies, and Professor by Courtesy in the Department of Civil and Environmental Engineering. He is also Co-director of the Center for Environmental Science and Policy (CESP) as well as of the Interdisciplinary Graduate Program in Environment and Resources (IPER). He was elected to the U.S. National Academy of Sciences in 2002 and received the National Conservation Achievement Award from the National Wildlife Foundation and the Edward T. Law Roe Award of the Society of Conservation Biology in 2003. He disseminates his message not only to students, but also to the general public, other scientists, and political figures through public lectures, seminars, classroom teaching, environmental assessment committees, media appearances, Congressional testimony, and research collaboration with colleagues. It was this ability to integrate and interpret the results of global climate research to such a wide audience that earned him the MacArthur Fellowship in 1992. Schneider founded the journal, *Climatic Change* in 1975 and serves as its Editor. His books include *The Co-evolution of Climate and Life*, *Encyclopedia of Climate and Weather*, *Climate Change Policy: A Survey* and *Wildlife Responses to Climate Change*. Further information can be found on his Web site: <http://stephenschneider.stanford.edu>.

Lisa Cirbus Sloan
University of California, Santa Cruz

Lisa Sloan is a Professor of Earth Sciences and the Director of the Climate Change and Impacts Laboratory at the University of California, Santa Cruz. Sloan joined the faculty at UCSC in 1995 and was awarded a fellowship from the David and Lucile Packard Foundation in 1998. Sloan's research is concentrated in two broad areas: (1) understanding the mechanisms of past climate changes, and (2) studying and modeling future climate change at regional scales and investigating the possible impacts of future climate change on human and natural systems. She has authored or coauthored more than 50 peer-reviewed articles and book chapters. For more information, see <http://www.es.ucsc.edu/~lcsloan/>.

Joel B. Smith
Stratus Consulting

Joel B. Smith, vice president with Stratus Consulting, has been analyzing climate change impacts and adaptation issues for over 19 years. He was a coordinating lead author for the synthesis chapter on climate change impacts for the Third Assessment Report of the Intergovernmental Panel on Climate Change, a lead author for the U.S. National Assessment on climate change impacts, and a technical coordinator on vulnerability and adaptation for the U.S. Country Studies Program, and is coordinator of the Pew Center on Global Climate Change series on environment. He has provided technical advice, guidance, and training on assessing climate change impacts and adaptation for clients such as the United Nations, the World Bank, the U.S. Environmental Protection Agency (EPA), the U.S. Agency for International Development, and the State of California. Mr. Smith worked for the U.S. EPA from 1984 to 1992, where he was the deputy director of Climate Change Division. He is a coeditor of EPA's

Report to Congress: *The Potential Effects of Global Climate Change on the United States* (1989); *As Climate Changes: International Impacts and Implications* (1995); and *Adaptation to Climate Change: Assessments and Issues* (1996). Mr. Smith received a BA from Williams College in 1979, and an MPP from the University of Michigan in 1982.

Matthew D. Summers, P.E.

California Department of Food and Agriculture

Matt Summers is an Air Resources Engineer in the Office of Agriculture and Environmental Stewardship at the California Department of Food and Agriculture. He has a technical background in energy systems and air quality and strives to develop creative approaches to resource issues. Matt was formerly a research staff member with the Department of Biological and Agricultural Engineering at the University of California at Davis, where he worked on biomass utilization in agriculture. Before that, he was with Lawrence Livermore National Laboratory, developing precision manufacturing systems. He has a master's degree in mechanical engineering and is completing his PhD in Biological Systems Engineering. He is a California registered professional engineer. Matt is a native of Yolo County, where he lives with his family.

Terry Surles, Ph.D.

California Energy Commission

Dr. Terry Surles is currently the Public Interest Energy Research (PIER) Program Manager for the California Energy Commission. This program is designed to bring new renewable energy, other distributed energy resource technologies, and demand-side-management technologies into the marketplace, to provide reliable, affordable, and safe electricity to the state. In his role of Assistant Director for Science and Technology, he is also responsible for coordinating climate change research, assessment, and mitigation activities. Before joining the Energy Commission, Dr. Surles was the Associate Laboratory Director for Energy Programs at Lawrence Livermore National Laboratory, following his time at the California Environmental Protection Agency as Deputy Secretary for Science and Technology. Dr. Surles was at Argonne National Laboratory for a number of years, holding a number of positions in the energy and environmental technology and evaluation area, with his last position being General Manager for Environmental Programs. Dr. Surles, was an environmental consultant to industry for Camp, Dresser, and McKee, and holds a PhD in Chemistry from Michigan State University.

Margaret Taylor, Ph.D.

University of California, Berkeley

Margaret Taylor is an Assistant Professor at the Goldman School of Public Policy at the University of California, Berkeley. Her research uses insights and methods drawn from organization theory, economics, history, and engineering to explore the effects of government actions on innovative activities in environmental and renewable energy technologies. Her PhD is in Engineering and Public Policy at Carnegie Mellon University, and her background includes legal and Capitol Hill experience in the areas of international trade, energy, and the environment.

Dr. Edward Vine, Ph.D.

California Institute for Energy and Environment (CIEE)

Dr. Edward Vine is Program Manager of the Environmental Program at the California Institute for Energy and Environment (CIEE). He provides technical assistance to the PIER Environmental Area (PIER-EA) Program at the California Energy Commission and is Program Administrator for two PIER-EA programs: the Environmental Exploratory Grant Program and the Climate Change Grant Program. Dr. Vine is also a Staff Scientist at the Lawrence Berkeley National Laboratory, and he has been involved in the evaluation of energy efficiency programs and technology performance measurement for over 25 years. Dr. Vine is widely published in the professional literature on the evaluation of energy efficiency programs and energy policy, and he is a

member of the American Evaluation Association, the Planning Committee of the International Energy Program Evaluation Conference, Association of Energy Services Professionals, and the California Demand-Side Management Measurement Advisory Committee. He is President of the Board of Directors of the International Energy Program Evaluation Conference, an Executive Board member of the Education for Sustainability Western Network (EFS West), and an Affiliated Faculty Member of the Energy and Resources Group at the University of California, Berkeley.

Doug Wickizer

California Department of Forestry and Fire Protection

Mr. Wickizer is the Department Chief for Environmental Protection, Regulation, and Forest Product Utilization for the California Department of Forestry and Fire Protection (CDF), where he has worked since 1973. His experience includes, Forest Practice Inspector, Forest Practice Review Team Chair, Service Forester, Forest Practice Litigation Coordinator, Environmental Protection Officer for the Department, Regulations Coordinator for the Board and Department of Forestry and Fire Protection, Committee Consultant for the Board, Chief of Department Forest Management Program, and Administrative Chief for Department South Region. The Department's interests and efforts in biomass utilization and Global Climate Change are a portion of his program efforts. He is currently a member of the Society of American Foresters, where he has served in a variety of capacities. Projects that Mr. Wickizer has helped bring to a successful conclusion include: major revision of the Forest Practice Rules during late 1980s and early 1990s, completion of the initial Soil Erosion Study, establishment of the Board Monitoring Study Group, The California Fire Plan, and the 2004 FRAP report. Mr. Wickizer was granted a bachelor's degree in Forest Land Management from Northern Arizona University in 1970.